

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE Allied Colonial Universities Conference is to be held at Burlington House to-day, July 9. Mr. James Bryce is to preside at the morning session, and Lord Strathcona and Mount Royal at the afternoon session. Official representatives have been appointed by the governing bodies of universities throughout the Empire to attend the conference. The universities of England and Wales, Scotland, and Ireland will be represented, and also fourteen Canadian universities, three Australian universities, New Zealand University, and the Cape of Good Hope University. Among the representatives appointed by colonial universities we notice the names of Prof. H. T. Bovey, F.R.S., Prof. E. Rutherford, F.R.S., Prof. J. G. MacGregor, F.R.S., Prof. R. Threlfall, F.R.S., Prof. Horace Lamb, F.R.S., and Prof. T. H. Beare. The following resolutions will be submitted:—(1) That in the opinion of this conference it is desirable that such relations should be established between the principal teaching universities of the Empire as will secure that special or local advantages for study, and in particular for post-graduate study and research, be made as accessible as possible to students from all parts of the King's dominions. Proposed by the Vice-Chancellor of Cambridge, seconded by the Vice-Chancellor of McGill University, Montreal, and supported by the principal of the University of London. (2) That a council, consisting in part of representatives of British and colonial universities, be appointed to promote the objects set out in the previous resolution, and that a committee be appointed to arrange for the constitution of the council. Proposed by the Pro-Vice-Chancellor of Oxford, seconded by Prof. R. Threlfall (representing the University of Sydney, New South Wales), and supported by the principal of the University of Birmingham. In addition to the above-named, Lord Kelvin, Sir Henry Roscoe, Prof. Rutherford, and several other representatives of universities have signified their intention of supporting the resolutions. Mr. R. B. Haldane, Sir Michael Foster, K.C.B., F.R.S., Sir Norman Lockyer, K.C.B., F.R.S., Mr. Fletcher Moulton, F.R.S., Prof. H. L. Callendar, F.R.S., Prof. J. A. Ewing, F.R.S., and Dr. H. P. Gurney (principal of the Durham College of Science) will also be among the speakers. A dinner will be held at the Hotel Cecil to-morrow evening, when the Prime Minister will occupy the chair.

In an address delivered at a congregation of the University of Birmingham on Saturday last, the Chancellor, Mr. Chamberlain, described the progress and purpose of the university, and referred to the scheme for a post-graduate institute of applied science in London. In the course of his remarks Mr. Chamberlain said that, shortly after the idea of a university for Birmingham and district was put forward, the promoters found that much more than had originally been contemplated would be necessary to keep abreast of modern work and modern enterprise. Accordingly, a million of money was asked for instead of the quarter of a million originally contemplated. Up to the present time donations to the amount of something like 450,000*l.* have been received. Of that amount, 300,000*l.* are being spent in the first buildings of the new university. The City of Birmingham has voted a contribution equivalent to a halfpenny rate, which will provide an annual contribution which at the present time is between 6000*l.* and 7000*l.* a year. The county councils of Worcestershire and Staffordshire have contributed a present sum of 500*l.* per annum each. As to the purpose of the university, the view is perpetually borne in mind that it is to be a seat of all learning and an establishment for the promotion of original research. Every branch of learning which has its technical side will be separately represented by its own library, its own laboratory, and its own museum. The constitution of the university has undoubtedly given a stimulus to the higher education throughout the United Kingdom. Following the example of Birmingham, the colleges of Liverpool and Manchester, and also of Leeds, are developing themselves on the technical side, and are applying for independent charters as separate universities. And a scheme has been put forward for a technical college in London with similar objects to those of Birmingham University. When all these institutions are completed, there will be in our

country, as there is already in Germany and in North America, a network of institutions all of which may help each other. These modern universities must of necessity be specialised to suit the conditions of the district in which they are established. May it not be, then, in the future that ideas, and even students, may be exchanged, and that many students, as in Germany already, may find their full course can only be completed by going from one university to another and seeking in each what it is best fitted to afford?

THE Lord Mayor of London laid the foundation stone of the new buildings of the University College of Sheffield on June 30. These buildings are part of a large scheme of extension and consolidation, and will cost more than 110,000*l.* The new metallurgical extension, containing new furnaces, is practically completed. The extensions for engineering, and new accommodation for electrical engineering, are in process of erection. The block for which the foundation has just been laid is situated on a site about three-quarters of a mile from the centre of the city, on the ridge of a hill, 420 feet above sea level, and adjoins the Weston Park on two sides. The general plan is that of buildings surrounding a quadrangle, with an annex for the library. The buildings on three sides of the quadrangle are to be erected immediately, the fourth side hereafter when required. The building on the west side of the quadrangle, with a front to the park, is for the departments comprising arts, physics, biology, chemistry, law and commerce. That on the north side—also with a front to the park—contains accommodation for architecture, and the whole of the medical department, comprising anatomy, physiology, pathology, bacteriology, and public health, together with lecture rooms and medical library. It is expected that college work will be in full swing in the new buildings in October, 1905. As the result of an appeal that was made a short time ago for funds which would enable a University of Sheffield to be constituted, the sum of 51,400*l.* has been subscribed towards the new buildings, but it is understood that a further sum of 10,000*l.* is required to complete the portion now to be proceeded with, whilst 10,000*l.* will also be needed for the library, and about 10,000*l.* to complete the equipment of the various laboratories. It is desired to make adequate provision for, and to grant degrees in, the four following faculties:—(1) Arts, including education and commerce; (2) pure science; (3) medicine; and (4) applied science (engineering, metallurgy and mining). The City Council has pledged itself by a unanimous vote, in case university powers are obtained, to grant an annual sum not exceeding one penny in the pound out of the rates, equivalent to a capitalised sum of about 200,000*l.* To carry out the proposed university scheme in its entirety, a further annual income of 5000*l.* would be required.

AT University College, London, on Monday, Prof. E. H. Starling, F.R.S., Dean of the Faculty of Science, in his report of the work of the last session, referred to the scheme for the incorporation of the college into the University of London, and the suggested institute for advanced technical work. He remarked that certain conditions had to be fulfilled before the incorporation could take place—namely, the provision of new buildings for the clinical school and for the boys' school. The financial means to completely carry out these objects were still wanting. The college would need 40,000*l.* for the building of the clinical school and 60,000*l.* for the boys' school. Believing that money would be forthcoming for so essential a step in the provision of higher education for London, the council of the college and the university were cooperating in drawing up a Bill to enable incorporation to take place, and they hoped that the Bill would be introduced next session. It was proposed in the Bill to seek general powers for the incorporation of other institutions into the university. Only by incorporation of these interests into one, and by giving to the Senate of the university full control over the whole university teaching of London, could they hope to be strong enough to develop higher education and research in accordance with the growing needs of the time. This being their policy, it was with some apprehension that he had seen the publication of a scheme for creating a body, well equipped and endowed, within the university, but not belonging to the university. If the control of the new institution was secured to the university it would be certain to succeed, and they

need not trouble about the self-contradictory statements of the aims and the objects of the new institution with which they were favoured by enthusiastic amateurs.

A VACATION course in practical and clinical bacteriology will be held at King's College, London, commencing Wednesday, August 5, and ending Saturday, August 15. Names must be sent in as soon as possible to the secretary or to Prof. Hewlett.

## SOCIETIES AND ACADEMIES.

### LONDON.

**Royal Society, June 11.**—"On the Propagation of Tremors over the Surface of an Elastic Solid." By Horace **Lamb**, F.R.S.

The paper treats of the propagation of vibrations over the surface of a "semi-infinite" isotropic elastic solid, *i.e.* a solid bounded only by a plane. For purposes of description, this plane is conceived as horizontal, and the solid as lying below it.

The vibrations are supposed due to an arbitrary application of force at a point. In the problem most fully discussed this force consists of an impulse applied normally to the surface; but some other cases, including that of an internal source of disturbance, are also considered. Owing to the complexity of the problem, attention is concentrated for the present on the vibrations as they manifest themselves at the free surface, and the modifications which the latter introduces into the character of the waves propagated into the interior are accordingly not examined minutely.

The investigation claims interest on theoretical grounds, and also in relation to the phenomena of earthquakes. Attempts to interpret seismic phenomena by the light of elastic theory have hitherto been based, for the most part, on the general laws of wave-propagation in an unlimited medium, as developed by Green and Stokes; but Lord Rayleigh's discovery of a special type of surface-waves has made it evident that the influence of the free surface in modifying the character of the vibrations is more definite, and more serious, than had been suspected. The present memoir seeks to take a further step in the adaptation of the theory to the actual conditions, by investigating cases of *forced* waves, and by abandoning the restriction to simple-harmonic vibrations.

It is found that the surface disturbance produced by a single impulse of short duration may be analysed roughly into two parts, which we may distinguish as the "minor tremor" and the "main shock," respectively. The minor tremor sets in at any place, with some abruptness, after an interval equal to the time which a wave of longitudinal displacement (in an unlimited medium) would take to traverse the distance from the source. Except for certain marked features at the inception, and again (to a lesser extent) at an epoch corresponding to that of direct arrival of transversal waves, it may be described, in general terms, as consisting of a long undulation leading up to the main shock, and dying out gradually after this has passed. Its time-scale is more and more protracted, and its amplitude more and more diminished, the greater the distance from the source. The main shock, on the other hand, is propagated as a solitary wave (with one maximum and one minimum, in both the horizontal and vertical displacements); its time-scale is constant, and its amplitude diminishes only in accordance with the usual law of annular divergence, so that its total energy, unlike that of the minor tremor, is maintained undiminished. Its velocity is that of free Rayleigh waves, and is accordingly somewhat less than that of waves of transversal displacement in an unlimited medium.

"A Method for the Investigation of Fossils by Serial Sections." By Prof. W. J. **Sollas**, F.R.S.

Mechanical difficulties preclude the study of fossils by serial thin slices, but serial polished surfaces may be obtained at any desired degree of proximity, and these, when the fossil and its matrix offer sufficient optical contrast, serve most of the purposes of thin slices. They may be photographed under the microscope, so as to furnish a trustworthy and permanent record. The sections may be used

to obtain reconstructions of the fossil in wax. Several fossils have been successfully studied in this way, such as *Palaeospondylus Gunni*, *Ophiura Egertoni*, *Lapworthura Miltoni*, *Monograptus priodon*, and *Palaeodiscus ferox*. The sections are obtained at regular intervals, usually of 0.025mm., by means of an apparatus designed for the purpose by the Rev. F. Jervis-Smith, F.R.S., reader of mechanics in the university.

"An Account of the Devonian Fish, *Palaeospondylus Gunni*, Traquair." By Prof. W. J. **Sollas**, F.R.S., and Ignera B. J. **Sollas**.

June 18.—"Some Preliminary Observations on the Assimilation of Carbon Monoxide by Green Plants." By Prof. W. B. **Bottomley** and Mr. Herbert **Jackson**. Communicated by Prof. J. Reynolds Green, F.R.S.

"The Bionomics of *Convoluta roscoffensis*." By Dr. F. W. **Gamble** and Frederick **Keeble**, M.A.

*Convoluta* is a minute green Turbellarian organism that lives in such prodigious numbers on the coast of Brittany as to cover long stretches of the beach with a thick green scum.

Previous observers have directed attention to the fact that *Convoluta* is not merely an animal, but is an association of an animal and a plant, or plant-like organism, which is represented by the green cells. These cells contain chlorophyll, perform photosynthesis, and store starch, but, unlike algal cells, they have no cell-wall, and they are believed to have no power of surviving the death of the animal tissue. Whether they are exceptional animal cells or infecting plant-cells, or algæ acquired in past time and now inherited, is unknown. But it is supposed that the life of the animal has been modified to suit their requirements, that from their reserves the animal is fed, and that to the renewal of these reserves its movements are directed.

The present paper is an attempt to gain further insight into this strange problem. Dealing first with the question of food, the authors show what rays of light are effective in producing a surplus of starch, but they believe that this reserve does not furnish the source of food on which the animal tissue of *Convoluta* is nourished; for not only does this starch disappear with extreme slowness (7-8 days) in darkness, but direct evidence is forthcoming that in all stages of development *Convoluta* can, and does, ingest, that in the earlier ones diatoms and algæ are normally ingested and digested, and that in the later stages the green cells are bodily aggregated and digested in the gut.

Passing to the development of the green cells, the authors find the first trace of these cells as colourless, nucleated structures in the gut of the recently hatched animal. Direct proof of the intrinsic or extrinsic origin of these colourless cells is still lacking. The indirect evidence, however, is strongly in favour of the latter mode of origin. On this view *Convoluta* makes a pure culture from a mixed infection.

Further analyses than heretofore of the effects of light, heat, gravity, and other agencies on the behaviour of *Convoluta* are given. The *tonic*, even more than the *tropic*, effect of light determines the periodic tidal movements, now to the surface of the sand, and now below the surface. The direct tropic effect of light is greatest in the green rays, absent in the blue, and reversed in the red. The effect is modified by the absorbing or scattering character of the background, and by the age of the animal. At the moment of hatching, *Convoluta* is aphototropic.

Geotropic response is not exhibited by those *Convoluta* which fail to develop their otolith. Normally it is shown from the moment of birth.

The paper concludes with a description of the daily and lunar variations in the size and behaviour of the colonies, and with an explanation of these variations in terms of the tropisms and other habits of *Convoluta*.

"The Spectra of Neon, Krypton, and Xenon." By E. C. C. **Baly**, Lecturer on Spectroscopy in University College, London.

The gases were illuminated by the passage of the discharge from an induction coil through them under reduced pressures. Vacuum tubes were filled with each one of them, and the glowing gas in a capillary portion was examined "end on" through a quartz window. Considerable difficulty was experienced in the use of the tubes, owing to the disintegration of the electrodes and the absorption of